MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2016/2017

EEE7316 – ENERGY POLICY, REGULATIONS AND STANDARDS

(MEEE)

29 MAY 2017
10.00 a.m – 1.00 p.m
(3 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 4 pages including the cover page with 4 Questions only.
2. Answer **ALL** questions. The distribution of the marks for each question is given.
3. Please write all your answers in the Answer Booklet provided.

Question 1

(a) List out **THREE** objectives of Malaysian National Renewable Energy (RE) Policy. [3 Marks]

(b) Renewable Energy Power Purchase Agreement (REPPA) was created in order to achieve a legal relationship between the RE power producer and the utility for Small Renewable Energy Power Programme (SREP). However, it was found that some REPPAs contained provisions that are unsuitable for RE power supply. One example of unsuitable clauses in REPPA is '***Performance provisions (i.e. facilities must deliver at the "specified annual capacity factor calculated as an annual moving average")***. List out another **TWO** examples of unsuitable clauses in REPPA. [6 Marks]

(c) The Biogen Full Scale Model (Biogen FSM) Demonstration Project was initiated in 2002. Its main aims are to catalyse the development of RE projects through effective demonstration of the techno-economic viability of biomass and biogas grid connected power generation projects, as well as through the provision of soft-loans to facilitate the development. The project is in cooperation between the Government of Malaysia and United Nations Development Programme/Global Environment Facility (UNDP-GEF) in which two full-scale model projects was constructed and commissioned in early 2009. During the implementation process there were initial interests of participants in the Biogen Full Scale Model (FSM) Demonstration Project, however many withdrew from it citing the lack of adequate or sufficient returns on investments. Briefly explain **TWO** constraints faced by RE power plants while implementing the project. [4 Marks]

(d) List out **THREE** fiscal incentives introduced by Malaysian Government to stimulate the growth and interests in the RE sector from 2000-2010. [6 Marks]

(e) In meeting Malaysia's energy requirements, the Government, Regulator, such as Suruhanjaya Tenaga (ST) and the Utilities such as Tenaga Nasional Berhad (TNB) and Sabah Electricity Sdn Bhd (SESB) presently do not consider Renewable Energy (RE) to have any significant impact on power generation. Briefly explain **THREE** reasons why RE contribution is not well factored into generation expansion analysis. [6 Marks]

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Question 2

(a) Motors are classified according to European Committee of Manufacturers of Electrical Machines and Power Electronics (CEMEP) in four efficiency classes. List out **THREE** of these classes. [3 Marks]

(b) In many commercial and industrial applications, apart from reducing energy costs, Variable Speed Drives (VSDs) also reduce maintenance costs. However, there may be instances where they may not be worth the additional cost or may be inappropriate to install. The benefits and disadvantages of VSDs should be considered for a particular motor application before selecting them. Briefly discuss **TWO** benefits and **TWO** disadvantages of using VSDs. [8 Marks]

(c) Table Q2a and Q2b show the data on energy savings by retrofitting VSD to an Air Handling Units (AHU) fans used for a hotel lobby.

Table Q2a: Field Survey of Existing Conditions

Equipment Reference	Motor Rating	Actual Running	Working Hours
AHU Room	15 kW 30 A	11.8 kW 18.3 A	24 Hrs

Table Q2b: Field Survey After VSD Installation

Equipment Reference	Motor Rating	Actual Running	Working Hours
AHU Room	15 kW 30 A	6 kW 8 A	24 Hrs

Tariff rate : Peak – RM 0.234/kWh (10.00-22.00hr),

Off-Peak – RM 0.144 kWh (22.00-10.00 hr)

(i) Based on the AHU Fan operation at (50 Hz) constant load for 24 hours per day, calculate the daily and yearly energy consumption before VSD installation. [4 Marks]

(ii) Calculate the total annual operating cost for 15 kW AHU fan (based on average tariff of peak & off-peak) before VSD installation. [2 Marks]

(iii) Calculate the total annual electricity of 15 kW AHU fan (based on average tariff of peak & off-peak) after VSD installation. [4 Marks]

(iv) Calculate savings per year compared AHU fan with installation of VSD. [2 Marks]

(v) Given that the total installation cost (VSD + panel modification) is RM 15, 000, calculate the Return of Investment (ROI). [2 Marks]

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Question 3

(a) Give the meanings of the following terms:

(i) Private installation licensee [3 Marks]
(ii) Registered electrical energy manager [3 Marks]
(iii) Metering point, and [3 Marks]
(iv) Effective date [3 Marks]

(b) What is the main function of the Demand Side Management Unit? [3 Marks]

(c) In what way, the obligation to submit information under Regulation 5 of Suruhanjaya Tenaga for a new installation is different from an existing installation? [2+2 Marks]

(d) The Green Building Index (GBI) Assessment scores for three different Residential New Construction (RNC) companies are given as in Table Q3. State the GBI rating of each company. [2+2+2 Marks]

Table Q3

Part	Item	Maximum Points	Company 1	Company 2	Company 3
1	Energy Efficiency	23	19	19	21
2	Indoor Environmental Quality	12	9	8	10
3	Sustainable Site Planning & Management	37	30	28	33
4	Material & Resources	10	7	6	8
5	Water Efficiency	12	10	7	10
6	Innovation	6	4	4	5
	Total Score	100	79	72	87

(e) An office building contains a main floor having a net floor area of 1115 m^2 and a first floor of 975 m^2 net area. The monthly average energy consumption is found to be 7840 kWh. Calculate the Building Energy Index (kWh/m^2/year). [2+2+2 Marks]

Question 4

(a) What are all the areas of classifications of energy efficiency requirements? [4 Marks]

(b) What are the important factors that should be considered in the architectural passive design? [4 Marks]

(c) Draw the flow chart of a detailed energy audit process. [4 Marks]

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(d) A residential consumer used to consume around 2700 kWh/year by utilizing a 1hp air-conditioner. Energy conservation measures were carried out at his premises at an additional cost of RM 585, and the latest energy consumption by the air-conditioner is found to be 1560 kWh/year. Determine the pay-back period assuming an energy tariff of RM 0.257/kWh. [7 Marks]

End of Paper